CENTER FOR HEALTH STATISTICS

DATA SUMMARY

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CHRONIC OBSTRUCTIVE PULMONARY DISEASE DEATHS CALIFORNIA, 1980-1996

Introduction

This report presents chronic obstructive pulmonary disease (COPD) death data in California for the years 1980 through 1996. Also included in this report are trend analyses and comparisons of the data by sex, age, race/ethnicity, and county.

COPD is a clinical term applied to persons with a permanent airflow obstruction associated with significant impairment. Individuals with COPD typically have symptoms of both chronic bronchitis and emphysema, but the classic triad also includes asthma. The majority of deaths due to COPD are caused by cigarette smoking (82 percent)[1], although cystic fibrosis, alpha1-antitrypsin deficiency, bronchiectasis and some rare forms of bullous lung disease can be causes as well.

There are over 30 million reported cases of COPD in the United States.[2] In 1996, COPD was the 4th leading cause of death in the United States[3] and California.[4] During that year, 11,373 Californians died of COPD representing more than one out of every nine COPD deaths nationwide.[3] Deaths due to COPD predominantly affect the elderly, those aged 55 and over, and Whites. COPD is also the only lung disease category where the death rate among Whites exceeds that of Blacks in the United States[3] and California.

Cigarette smoking is the leading cause of preventable disease and death in the United States. Due to the prevalence of smoking-related morbidity and mortality in our nation, the United States Public Health Service has established a number of health objectives, including one for COPD, which are published in *Healthy People 2000 Review 1997*.[5] California's progress in meeting the national health objective for COPD is presented in this report.

Chronic Obstructive Pulmonary Disease Deaths

As shown in **Table 1** (page 5), the number of COPD deaths progressively increased from a low of 6,125 in 1980 to a high of 11,373 in 1996 representing a 85.7 percent increase. The number of COPD deaths among males and females also showed increases during this period. The COPD deaths among males increased from a low of 3,866 in 1980 to a high of 5,515 in 1996 representing a 42.7 percent increase. The COPD deaths among females increased substantially from a low of 2,259 in 1980 to a high of 5,858 in 1996 representing a 159.3 percent increase. Further comparison of the COPD death numbers by sex showed males had more deaths than females from 1980 through 1993. Beginning in 1994, however, the number of COPD deaths among females surpassed that of the males.

Table 2 (page 6) shows COPD deaths by the four major race/ethnic groups from 1985 though 1996. Throughout the 12-year period, the majority of deaths due to COPD were overwhelmingly among Whites (87.4 percent) followed by Blacks (4.8 percent), Hispanics (4.4 percent), and Asian/Other (3.4 percent). Analysis of the trend data revealed relatively constant increases in the number of COPD deaths among each of the four race/ethnic groups from 1980 through 1996. During this period, the number of COPD deaths increased 117.9 percent among Asian/Other, 60.7 percent among Blacks, 63.4 percent among Hispanics, and 26.9 percent among Whites.

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Chronic Obstructive Pulmonary Disease Crude Death Rates

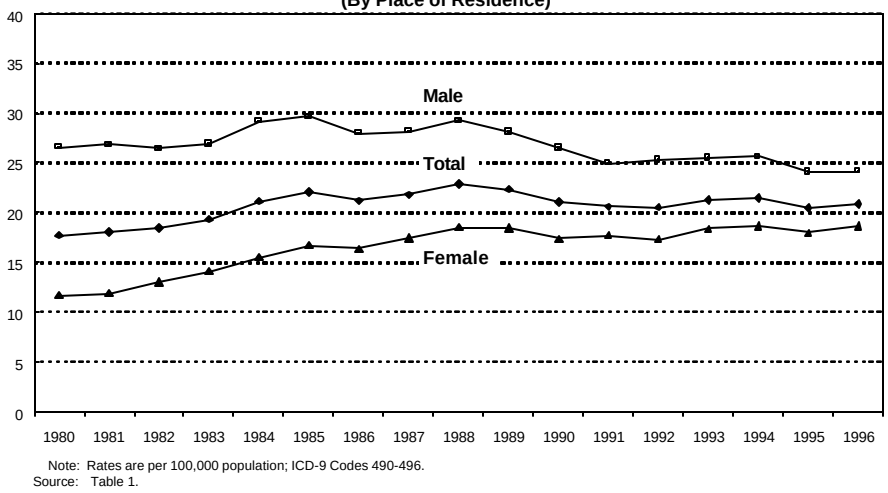
As shown in **Table 1** (page 5), California's crude death rates due to COPD increased significantly from a low of 25.8 per 100,000 population in 1980 to a high of 35.1 in 1996 representing a 36.0 percent increase. COPD death rates among females revealed a similar pattern. Their death rate was 18.7 in 1980 and increased 94.1 percent through the following 16 years to a high of 36.3 in 1996, which was also a significant increase. In contrast, the COPD death rate among males was 33.0 in 1980, peaked to a high of 37.1 in 1985, and decreased back down to 34.0 in 1996. The trend in the male death rates from 1980 through 1996 was not significant. Further analysis of the COPD death rates by sex also revealed male COPD death rates were higher than female death rates from 1980 through 1992, although the differential between their death rates has narrowed over the 13-year period. Beginning in 1994, the female COPD death rate surpassed the male death rate, and continued to be higher in 1995 and 1996.

Table 2 (page 6) shows COPD crude death rates by the four major race/ethnic groups. From 1985 through 1996, Whites by far had the highest death rates. Their death rates were over two times higher than Blacks, over four times higher than Asian/Other, and nearly ten times higher than Hispanics. Nevertheless, all four race/ethnic groups showed increases in their death rates since 1985. The COPD death rates among Whites increased significantly from 47.4 per 100,000 population in 1985 to a high of 56.9 in 1996 representing a 20.0 percent increase. The Black COPD death rates rose 36.0 percent from 18.9 in 1985 to a high of 25.7 in 1996, which was significant. The COPD death rates among Asian/Other also increased significantly from 10.9 in 1985 to a high of 14.0 in 1996 representing a 28.4 percent increase. The Hispanic COPD death rates increased from 5.3 in 1985 to 5.7 in 1996, but this trend was not significant.

Chronic Obstructive Pulmonary Disease Age-Adjusted Death Rates

As illustrated in **Figure 1**, the COPD age-adjusted death rates among the total population climbed from a low of 17.7 per 100,000 population in 1980 to a high of 22.9 in 1988. Over the subsequent eight years, the age-adjusted death rates dropped back down to 20.8 in 1996. However, the overall upward trend in the age-adjusted death rates among the total population from 1980 through 1996 was significant. Analysis of the COPD age-adjusted death rates by sex showed the male age-adjusted death rate was 26.5 in 1980, increased to a high of 29.6 in 1985, and significantly declined over the next 11 years to a low of 24.1 in 1996. In contrast, the female age-adjusted death increased significantly from a low of 11.7 in 1980 to a high of 18.7 in 1996. Even though the female age-adjusted death rates have risen significantly, the male age-adjusted death rates continue to be higher than the female age-adjusted death rates, but the gap has narrowed over the 17-year period. The male age-adjusted death rate was 2.3 times higher than the female age-adjusted death rate in 1980. Since then, the ratio of male to female age-adjusted death rates decreased steadily over the years to a low of 1.3 to 1 in 1996.

FIGURE 1
CHRONIC OBSTRUCTIVE PULMONARY DISEASE
DEATH RATES BY SEX
CALIFORNIA, 1980-1996
(By Place of Residence)



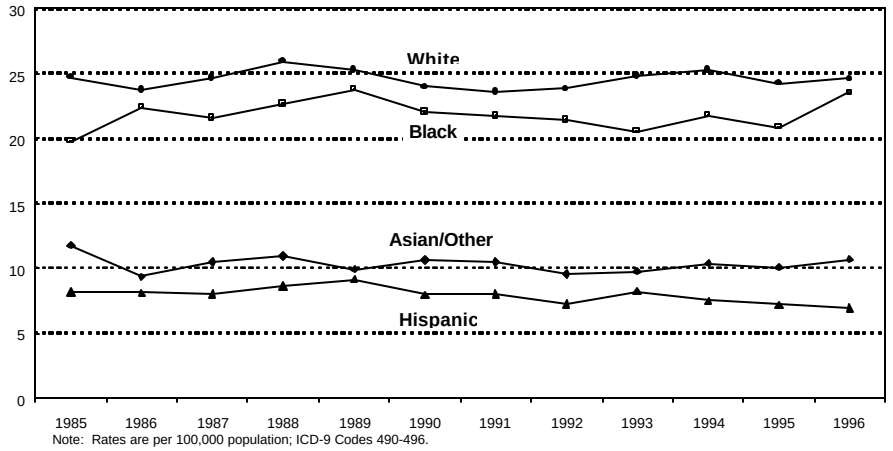
Note: Rates are per 100,000 population; ICD-9 Codes 490-496.
Source: Table 1.

During each of the 17 years examined in this report, California has been below the year 2000 national health objective of no more than 25 age-adjusted COPD deaths per 100,000 population. Based on projections from 1980 through 1996, California's age-adjusted COPD death rate should remain below the national objective by the year 2000.

Chronic Obstructive Pulmonary Disease Age-Adjusted Death Rates (continued)

As illustrated in **Figure 2**, Whites had the highest age-adjusted death rates followed by Blacks, Asian/Other, and Hispanics from 1985 through 1996. Also, the age-adjusted death rates among Whites and Blacks were significantly higher than the age-adjusted death rates among Asian/Other and Hispanics during this period. The White age-adjusted death rate was 24.7 per 100,000 population in 1985, increased to a high of 25.9 in 1988, and then dropped back down to 24.6 in 1996. The Black age-adjusted death rate was 19.8 in 1985, rose to a high of 23.8 in 1989, decreased to 20.6 in 1993, and climbed back up to 23.5 in 1996. The age-adjusted death rate among Asian/Other was 11.8 in 1985, dropped to 9.4 in 1986, and fluctuated over the following 10 years to 10.7 in 1996. Although the age-adjusted death rates among Whites, Blacks, and Asian/Other exhibited a considerable amount of variation over the twelve-year period, regression analysis revealed no significant upward or downward trend in the age-adjusted death rates among any of these race/ethnic groups. However, there was a significant downward trend in the age-adjusted death rates among Hispanics. Their age-adjusted death rate was 8.2 in 1985, increased to a high of 9.2 in 1989, and then decreased over the following seven years to a low of 6.9 in 1996.

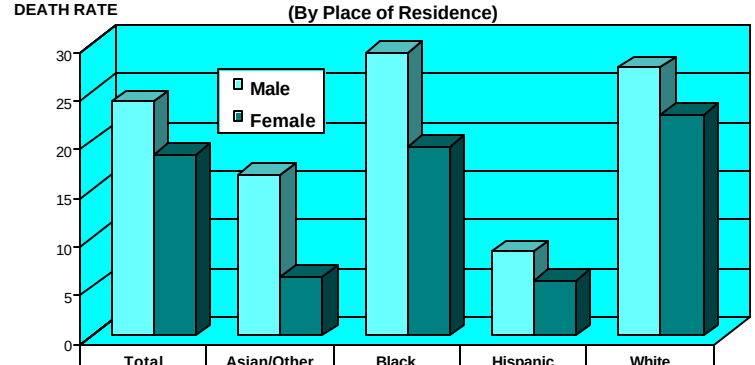
FIGURE 2
CHRONIC OBSTRUCTIVE PULMONARY DISEASE
DEATH RATES BY RACE/ETHNICITY
CALIFORNIA, 1985-1996
(By Place of Residence)



Note: Rates are per 100,000 population; ICD-9 Codes 490-496.
White, Black, and Asian/Other exclude Hispanic. Hispanic includes any race category.
Source: Table 2.

As illustrated in **Figure 3**, males had higher age-adjusted death rates than females in 1996, regardless of the race/ethnic group. Of the four race/ethnic groups, Asian/Other had the highest ratio of male to female age-adjusted death rates, which was 2.7 to 1. In comparing the male age-adjusted death rates by race/ethnicity, Black males had the highest age-adjusted death rate, which was 29.2 per 100,000 population. Their age-adjusted death rate was higher than the age-adjusted death rate among White males (27.7), and significantly higher than the age-adjusted death rates among Asian/Other males (16.6), and among Hispanic males (8.7). In comparing the female age-adjusted death rates by race/ethnicity, White females had the highest age-adjusted death rate, which was 22.8 per 100,000 population. Their age-adjusted death rate was higher than the age-adjusted death rate among Black females (19.5), and significantly higher than the age-adjusted death rates among Asian/Other females (6.1), and among Hispanic females (5.7).

FIGURE 3
CHRONIC OBSTRUCTIVE PULMONARY DISEASE
DEATH RATES BY RACE/ETHNICITY
CALIFORNIA, 1996
(By Place of Residence)



	Total	Asian/Other	Black	Hispanic	White
Male	24.1	16.6	29.2	8.7	27.7
Female	18.7	6.1	19.5	5.7	22.8

Note: Rates are per 100,000 population; ICD-9 Codes 490-496.
White, Black, and Asian/Other excludes Hispanic ethnicity. Hispanic includes any race category.
Source: Department of Finance, Race/Ethnic Population by County with Age and Sex Detail, 1970-1996, January 1998.
Department of Health Services, Death Records.

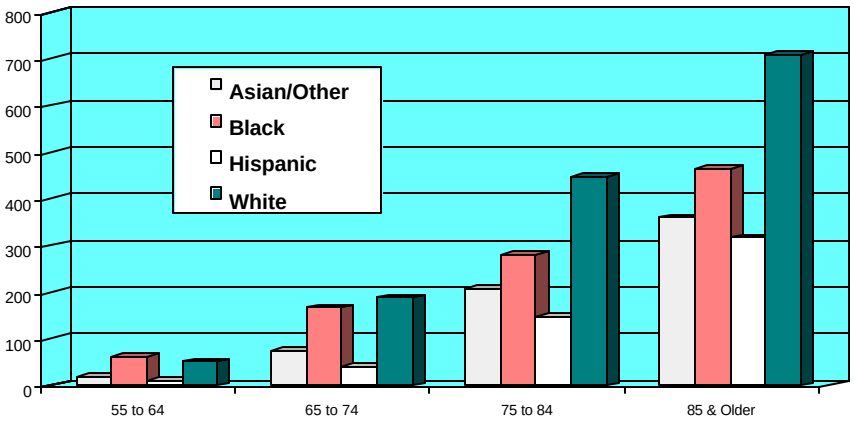
Chronic Obstructive Pulmonary Disease Age-Specific Deaths and Death Rates

As shown in **Table 3** (page 7), the majority of deaths due to COPD was among the elderly in 1996. California residents aged 75-84 had the greatest number of deaths due to COPD (4,535) followed by those aged 65-74 (3,037), and aged 85 and over (2,332). Of the four race/ethnic groups, Whites by far had the most COPD deaths (9,745) or 85.7 percent of the total number of COPD deaths in California. Correspondingly, they had the most COPD deaths in almost all of the eleven age groups. Analysis of the COPD deaths by race/ethnicity and sex revealed White females had the greatest number of deaths (5,156), although White males were close behind with 4,589 deaths.

Table 3 (page 7) also shows that the highest age-specific COPD death rates were among California residents aged 55 and over in 1996, regardless of their race/ethnicity. Further analysis of the age-specific death rates among those aged 55 and over by race/ethnicity and sex revealed males in every race/ethnic category had higher age-specific death rates than females, except for Whites aged 55-64.

As illustrated in **Figure 4**, Whites and Blacks had the highest age-specific COPD death rates, while Asian/Other and Hispanics had the lowest in 1996. Among those aged 85 and over, Whites had a considerably higher age-specific death rate (710.3 per 100,000 population) than Blacks (465.9), Asian/Other (360.7), and Hispanics (317.4). The same pattern existed among those aged 75-84 where Whites had the highest age-specific death rate (448.9) followed by Blacks (280.7), Asian/Other (207.8), and Hispanics (148.2). For those aged 65-74, Whites again had the highest age-specific death rate, but the differential between their age-specific death rate (188.7) and the Black age-specific death rate (168.3) was much smaller than the two older age groups. Asian/Other and Hispanics within this age group followed with age-specific death rates of 75.3 and 40.3, respectively. Unlike the three older age groups, Blacks had the highest age-specific death rate (61.7) among those aged 55-64, whereas Whites had the second highest age-specific death rate (51.2) followed by Asian/Other (20.2), and Hispanics (11.3).

FIGURE 4
CHRONIC OBSTRUCTIVE PULMONARY DISEASE DEATH RATES BY RACE/ETHNICITY AND AGE CALIFORNIA, 1996 (By Place of Residence)



Note: Rates are per 100,000 population; ICD-9 Codes 490-496.
White, Black, and Asian/Other excludes Hispanic ethnicity. Hispanic ethnicity includes any race category.
Source: Table 3.

Chronic Obstructive Pulmonary Disease Death Rates Among California Counties

Table 4 (page 8) shows the 1994-1996 three-year average number of deaths and rates due to COPD for California and the 58 counties. Of the 58 counties, Los Angeles County had the highest number of deaths (2,623.3) followed by San Diego County (986.0), and Orange County (764.0).

Of the counties with reliable crude death rates due to COPD, Lake County had the highest crude death rate (104.3 per 100,000 population) and Imperial County had the lowest crude death rate (22.1). The crude rates for these two counties differed by a factor of 4.7 to 1. California's crude death rate due to COPD was 34.5.

Of the counties with reliable age-adjusted death rates due to COPD, Shasta County had the highest age-adjusted death rate (36.1 per 100,000 population), while Imperial County had the lowest age-adjusted death rate (15.0). California's age-adjusted death rate due to COPD was 21.0. In assessing California's progress in meeting the year 2000 national health objective of no more than 25 age-adjusted COPD deaths per 100,000 population, 40 out of California's 58 counties have met the objective.

TABLE 1
DEATHS DUE TO CHRONIC OBSTRUCTIVE PULMONARY DISEASE
BY SEX
CALIFORNIA. 1980-1996
(By Place of Residence)

SEX	EVENT YEAR	DEATHS	POPULATION	CRUDE RATE	AGE-ADJUSTED RATE	95% CONFIDENCE LIMITS LOWER	UPPER
TOTAL							
	1996	11,373	32,383,811	35.1	20.8	20.4	21.3
	1995	10,765	32,062,912	33.6	20.5	20.0	20.9
	1994	11,017	31,790,557	34.7	21.5	21.1	21.9
	1993	10,625	31,515,753	33.7	21.3	20.8	21.7
	1992	10,040	31,186,559	32.2	20.6	20.1	21.0
	1991	9,703	30,563,276	31.7	20.6	20.2	21.1
	1990	9,647	29,942,397	32.2	21.1	20.6	21.5
	1989	9,759	29,142,106	33.5	22.4	21.9	22.9
	1988	9,700	28,393,094	34.2	22.9	22.4	23.4
	1987	8,979	27,716,860	32.4	21.8	21.4	22.3
	1986	8,477	27,052,291	31.3	21.2	20.7	21.7
	1985	8,606	26,402,633	32.6	22.1	21.6	22.6
	1984	7,976	25,816,294	30.9	21.1	20.6	21.6
	1983	7,093	25,336,301	28.0	19.3	18.8	19.8
	1982	6,660	24,805,011	26.8	18.5	18.0	18.9
	1981	6,333	24,277,674	26.1	18.1	17.6	18.5
	1980	6,125	23,780,068	25.8	17.7	17.3	18.2
MALE							
	1996	5,515	16,227,924	34.0	24.1	23.5	24.8
	1995	5,290	16,062,552	32.9	24.1	23.4	24.8
	1994	5,457	15,921,009	34.3	25.6	24.9	26.4
	1993	5,326	15,782,166	33.7	25.5	24.8	26.2
	1992	5,142	15,616,376	32.9	25.3	24.6	26.0
	1991	4,942	15,301,183	32.3	25.0	24.3	25.7
	1990	5,081	14,989,516	33.9	26.5	25.8	27.3
	1989	5,125	14,573,988	35.2	28.1	27.3	28.9
	1988	5,211	14,181,700	36.7	29.3	28.4	30.1
	1987	4,887	13,825,118	35.3	28.2	27.4	29.0
	1986	4,721	13,474,197	35.0	28.0	27.2	28.8
	1985	4,870	13,130,674	37.1	29.6	28.8	30.5
	1984	4,660	12,818,768	36.4	29.2	28.3	30.1
	1983	4,211	12,559,834	33.5	26.9	26.1	27.7
	1982	4,034	12,275,613	32.9	26.4	25.6	27.3
	1981	3,965	11,993,514	33.1	26.9	26.0	27.7
	1980	3,866	11,722,769	33.0	26.5	25.7	27.4
FEMALE							
	1996	5,858	16,155,887	36.3	18.7	18.1	19.2
	1995	5,475	16,000,360	34.2	18.0	17.5	18.5
	1994	5,560	15,869,548	35.0	18.6	18.1	19.2
	1993	5,299	15,733,587	33.7	18.4	17.8	18.9
	1992	4,898	15,570,183	31.5	17.3	16.8	17.8
	1991	4,761	15,262,093	31.2	17.7	17.2	18.3
	1990	4,566	14,952,881	30.5	17.4	16.8	17.9
	1989	4,634	14,568,118	31.8	18.5	17.9	19.1
	1988	4,489	14,211,394	31.6	18.5	18.0	19.1
	1987	4,092	13,891,742	29.5	17.4	16.9	18.0
	1986	3,756	13,578,094	27.7	16.4	15.8	17.0
	1985	3,736	13,271,959	28.1	16.7	16.1	17.3
	1984	3,316	12,997,526	25.5	15.5	14.9	16.1
	1983	2,882	12,776,467	22.6	14.1	13.6	14.7
	1982	2,626	12,529,398	21.0	13.0	12.5	13.6
	1981	2,368	12,284,160	19.3	11.9	11.4	12.4
	1980	2,259	12,057,299	18.7	11.7	11.2	12.2

Note: Rates are per 100,000 population; ICD-9 Codes 490-496.

Source: State of California, Department of Finance, Race/Ethnic Population Estimates by County with Age and Sex Detail, 1970-1996, January 1998.
State of California, Department of Health Services, Death Records.

TABLE 2
DEATHS DUE TO CHRONIC OBSTRUCTIVE PULMONARY DISEASE
BY RACE/ETHNICITY
CALIFORNIA, 1985-1996
(By Place of Residence)

RACE/ ETHNICITY	EVENT YEAR	DEATHS	POPULATION	CRUDE RATE	AGE-ADJUSTED RATE	95% CONFIDENCE LIMITS LOWER	UPPER
ASIAN/OTHER							
	1996	512	3,645,998	14.0	10.7	9.7	11.7
	1995	466	3,530,931	13.2	10.1	9.1	11.0
	1994	435	3,429,125	12.7	10.4	9.4	11.4
	1993	385	3,323,013	11.6	9.8	8.8	10.8
	1992	351	3,209,399	10.9	9.6	8.6	10.6
	1991	356	3,068,424	11.6	10.5	9.4	11.6
	1990	332	2,930,570	11.3	10.6	9.5	11.8
	1989	273	2,774,167	9.8	9.9	8.7	11.1
	1988	286	2,616,586	10.9	11.0	9.7	12.3
	1987	252	2,465,134	10.2	10.5	9.2	11.8
	1986	207	2,313,141	8.9	9.4	8.1	10.7
	1985	235	2,158,886	10.9	11.8	10.2	13.3
BLACK							
	1996	585	2,275,401	25.7	23.5	21.5	25.5
	1995	504	2,250,502	22.4	20.9	19.0	22.7
	1994	519	2,232,841	23.2	21.8	19.8	23.7
	1993	471	2,214,376	21.3	20.6	18.6	22.5
	1992	479	2,192,451	21.8	21.4	19.4	23.4
	1991	474	2,147,691	22.1	21.7	19.7	23.7
	1990	468	2,105,207	22.2	22.0	19.9	24.1
	1989	488	2,061,823	23.7	23.8	21.6	25.9
	1988	455	2,024,779	22.5	22.7	20.5	24.8
	1987	415	1,992,361	20.8	21.6	19.4	23.7
	1986	421	1,958,844	21.5	22.4	20.2	24.6
	1985	364	1,923,209	18.9	19.8	17.7	21.9
HISPANIC							
	1996	531	9,330,740	5.7	6.9	6.3	7.6
	1995	499	9,100,994	5.5	7.2	6.5	7.9
	1994	507	8,882,966	5.7	7.5	6.8	8.2
	1993	548	8,658,118	6.3	8.2	7.5	9.0
	1992	437	8,421,133	5.2	7.3	6.6	8.0
	1991	456	8,097,870	5.6	8.0	7.3	8.8
	1990	433	7,774,789	5.6	8.0	7.2	8.8
	1989	445	7,419,574	6.0	9.2	8.3	10.0
	1988	400	7,077,579	5.7	8.6	7.8	9.5
	1987	363	6,754,398	5.4	8.0	7.2	8.9
	1986	330	6,428,436	5.1	8.1	7.2	9.0
	1985	325	6,103,662	5.3	8.2	7.3	9.1
WHITE							
	1996	9,745	17,131,672	56.9	24.6	24.1	25.2
	1995	9,296	17,180,485	54.1	24.2	23.7	24.8
	1994	9,556	17,245,625	55.4	25.3	24.7	25.8
	1993	9,221	17,320,246	53.2	24.8	24.2	25.4
	1992	8,773	17,363,576	50.5	23.8	23.3	24.4
	1991	8,417	17,249,291	48.8	23.6	23.0	24.1
	1990	8,414	17,131,831	49.1	24.0	23.4	24.5
	1989	8,553	16,886,542	50.6	25.3	24.7	25.9
	1988	8,559	16,674,150	51.3	25.9	25.4	26.5
	1987	7,949	16,504,967	48.2	24.6	24.0	25.2
	1986	7,519	16,351,870	46.0	23.7	23.1	24.3
	1985	7,682	16,216,876	47.4	24.7	24.1	25.3

Note: Rates are per 100,000 population; ICD-9 Codes 490-496.
White, Black, and Asian/Other exclude Hispanic ethnicity. Hispanic includes any race category.

Source: State of California, Department of Finance, Race/Ethnic Population Estimates by County with Age and Sex Detail, 1970-1996, January 1998.
State of California, Department of Health Services, Death Records.

TABLE 3
DEATHS DUE TO CHRONIC OBSTRUCTIVE PULMONARY DISEASE
BY RACE/ETHNICITY. AGE. AND SEX
CALIFORNIA. 1996
(By Place of Residence)

RACE/ ETHNICITY	AGE GROUPS	1996 DEATHS			POPULATION			AGE-SPECIFIC DEATH RATE			95% CONFIDENCE LIMITS					
											TOTAL		MALE		FEMALE	
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	LOWER	UPPER	LOWER	UPPER	LOWER	UPPER
TOTAL																
	Under 1	2	1	1	540,625	276,538	264,087	0.4 *	0.4 *	0.4 *	0.0	0.9	0.0	1.1	0.0	1.1
	1 to 4	5	5	0	2,298,325	1,175,708	1,122,617	0.2 *	0.4 *	0.0 +	0.0	0.4	0.1	0.8	-	-
	5 to 14	18	12	6	4,914,945	2,514,194	2,400,751	0.4	0.5	0.2 *	0.2	0.5	0.2	0.7	0.0	0.4
	15 to 24	24	12	12	4,217,867	2,198,841	2,019,026	0.6	0.5	0.6	0.3	0.8	0.2	0.9	0.3	0.9
	25 to 34	42	20	22	5,357,377	2,828,447	2,528,930	0.8	0.7	0.9	0.5	1.0	0.4	1.0	0.5	1.2
	35 to 44	97	45	52	5,401,744	2,741,290	2,660,454	1.8	1.6	2.0	1.4	2.2	1.2	2.1	1.4	2.5
	45 to 54	300	144	156	3,806,109	1,887,994	1,918,115	7.9	7.6	8.1	7.0	8.8	6.4	8.9	6.9	9.4
	55 to 64	979	489	490	2,359,866	1,146,990	1,212,876	41.5	42.6	40.4	38.9	44.1	38.9	46.4	36.8	44.0
	65 to 74	3,037	1,543	1,494	1,954,134	879,924	1,074,210	155.4	175.4	139.1	149.9	160.9	166.6	184.1	132.0	146.1
	75 to 84	4,535	2,219	2,316	1,161,701	465,740	695,961	390.4	476.4	332.8	379.0	401.7	456.6	496.3	319.2	346.3
	85 & Older	2,332	1,024	1,308	371,118	112,258	258,860	628.4	912.2	505.3	602.9	653.9	856.3	968.1	477.9	532.7
	Unknown	2	1	1												
	Total	11,373	5,515	5,858	32,383,811	16,227,924	16,155,887	35.1	34.0	36.3	34.5	35.8	33.1	34.9	35.3	37.2
ASIAN/OTHER																
	Under 1	0	0	0	60,717	31,247	29,470	0.0 +	0.0 +	0.0 +	-	-	-	-	-	-
	1 to 4	1	1	0	254,397	131,069	123,328	0.4 *	0.8 *	0.0 +	0.0	1.2	0.0	2.3	-	-
	5 to 14	3	2	1	564,354	288,489	275,865	0.5 *	0.7 *	0.4 *	0.0	1.1	0.0	1.7	0.0	1.1
	15 to 24	3	3	0	533,767	274,693	259,074	0.6 *	1.1 *	0.0 +	0.0	1.2	0.0	2.3	-	-
	25 to 34	6	4	2	599,056	301,165	297,891	1.0 *	1.3 *	0.7 *	0.2	1.8	0.0	2.6	0.0	1.6
	35 to 44	5	3	2	631,504	303,109	328,395	0.8 *	1.0 *	0.6 *	0.1	1.5	0.0	2.1	0.0	1.5
	45 to 54	13	6	7	438,067	207,939	230,128	3.0	2.9 *	3.0 *	1.4	4.6	0.6	5.2	0.8	5.3
	55 to 64	52	28	24	256,917	120,782	136,135	20.2	23.2	17.6	14.7	25.7	14.6	31.8	10.6	24.7
	65 to 74	142	105	37	188,491	81,782	106,709	75.3	128.4	34.7	62.9	87.7	103.8	152.9	23.5	45.8
	75 to 84	192	140	52	92,392	39,642	52,750	207.8	353.2	98.6	178.4	237.2	294.7	411.7	71.8	125.4
	85 & Older	95	56	39	26,336	11,231	15,105	360.7	498.6	258.2	288.2	433.3	368.0	629.2	177.2	339.2
	Unknown	0	0	0												
	Total	512	348	164	3,645,998	1,791,148	1,854,850	14.0	19.4	8.8	12.8	15.3	17.4	21.5	7.5	10.2
BLACK																
	Under 1	1	1	0	37,276	18,939	18,337	2.7 *	5.3 *	0.0 +	0.0	7.9	0.0	15.6	-	-
	1 to 4	1	1	0	170,539	86,386	84,153	0.6 *	1.2 *	0.0 +	0.0	1.7	0.0	3.4	-	-
	5 to 14	7	4	3	388,094	196,545	191,549	1.8 *	2.0 *	1.6 *	0.5	3.1	0.0	4.0	0.0	3.3
	15 to 24	5	4	1	345,698	182,527	163,171	1.4 *	2.2 *	0.6 *	0.2	2.7	0.0	4.3	0.0	1.8
	25 to 34	10	6	4	395,287	203,575	191,712	2.5 *	2.9 *	2.1 *	1.0	4.1	0.6	5.3	0.0	4.1
	35 to 44	24	12	12	371,892	180,097	191,795	6.5	6.7	6.3	3.9	9.0	2.9	10.4	2.7	9.8
	45 to 54	47	19	28	242,802	114,139	128,663	19.4	16.6	21.8	13.8	24.9	9.2	24.1	13.7	29.8
	55 to 64	94	51	43	152,306	71,336	80,970	61.7	71.5	53.1	49.2	74.2	51.9	91.1	37.2	69.0
	65 to 74	172	93	79	102,194	43,656	58,538	168.3	213.0	135.0	143.2	193.5	169.7	256.3	105.2	164.7
	75 to 84	150	84	66	53,430	19,675	33,755	280.7	426.9	195.5	235.8	325.7	335.6	518.2	148.4	242.7
	85 & Older	74	25	49	15,883	4,669	11,214	465.9	535.4	437.0	359.8	572.1	325.6	745.3	314.6	559.3
	Unknown	0	0	0												
	Total	585	300	285	2,275,401	1,121,544	1,153,857	25.7	26.7	24.7	23.6	27.8	23.7	29.8	21.8	27.6
HISPANIC																
	Under 1	0	0	0	252,617	128,626	123,991	0.0 +	0.0 +	0.0 +	-	-	-	-	-	-
	1 to 4	1	1	0	1,034,656	527,237	507,419	0.1 *	0.2 *	0.0 +	0.0	0.3	0.0	0.6	-	-
	5 to 14	3	2	1	1,816,510	925,990	890,520	0.2 *	0.2 *	0.1 *	0.0	0.4	0.0	0.5	0.0	0.3
	15 to 24	6	2	4	1,436,639	749,483	687,156	0.4 *	0.3 *	0.6 *	0.1	0.8	0.0	0.6	0.0	1.2
	25 to 34	6	2	4	1,808,376	1,012,882	795,494	0.3 *	0.2 *	0.5 *	0.1	0.6	0.0	0.5	0.0	1.0
	35 to 44	7	5	2	1,372,005	720,340	651,665	0.5 *	0.7 *	0.3 *	0.1	0.9	0.1	1.3	0.0	0.7
	45 to 54	26	11	15	747,447	376,227	371,220	3.5	2.9 *	4.0	2.1	4.8	1.2	4.7	2.0	6.1
	55 to 64	47	29	18	416,154	200,126	216,028	11.3	14.5	8.3	8.1	14.5	9.2	19.8	4.5	12.2
	65 to 74	113	65	48	280,103	126,447	153,656	40.3	51.4	31.2	32.9	47.8	38.9	63.9	22.4	40.1
	75 to 84	181	91	90	122,130	48,089	74,041	148.2	189.2	121.6	126.6	169.8	150.4	228.1	96.4	146.7
	85 & Older	140	69	71	44,103	15,454	28,649	317.4	446.5	247.8	264.9	370.0	341.1	551.8	190.2	305.5
	Unknown	1	1	0												
	Total	531	278	253	9,330,740	4,830,901	4,499,839	5.7	5.8	5.6	5.2	6.2	5.1	6.4	4.9	6.3
WHITE																
	Under 1	1	0	1	190,015	97,726	92,289	0.5 *	0.0 +	1.1 *	0.0	1.6	-	-	0.0	3.2
	1 to 4	2	2	0	838,733	431,016	407,717	0.2 *	0.5 *	0.0 +	0.0	0.6	0.0	1.1	-	-
	5 to 14	5	4	1	2,145,987	1,103,170	1,042,817	0.2 *	0.4 *	0.1 *	0.0	0.4	0.0	0.7	0.0	0.3
	15 to 24	10	3	7	1,901,763	992,138	909,625	0.5 *	0.3 *	0.8 *	0.2	0.9	0.0	0.6	0.2	1.3
	25 to 34	20	8	12	2,554,658	1,310,825	1,243,833	0.8	0.6 *	1.0	0.4	1.1	0.2	1.0	0.4	1.5
	35 to 44	61	25	36	3,026,343	1,537,744	1,488,599	2.0	1.6	2.4	1.5	2.5	1.0	2.3	1.6	3.2
	45 to 54	214	108	106	2,377,793	1,189,689	1,188,104	9.0	9.1	8.9	7.8	10.2	7.4	10.8	7.2	10.6
	55 to 64	786	381	405	1,534,489	754,746	779,743	51.2	50.5	51.9	47.6	54.8	45.4	55.5	46.9	57.0
	65 to 74	2,610	1,280	1,330	1,383,346	628,039	755,307	188.7	203.8	176.1	181.4	195.9	192.6	215.0	166.6	185.6
	75 to 84	4,012	1,904	2,108	893,749	358,334	535,415	448.9	531.3	393.7	435.0	462.8	507.5	555.2	376.9	410.5
	85 & Older	2,023	874	1,149	284,796	80,904	203,892	710.3	1,080.3	563.5	679.4	741.3	1,008.7	1,151.9	530.9	596.1
	Unknown	1	0	1												
	Total	9,745	4,589	5,156	17,131,672	8,484,331	8,647,341	56.9	54.1	59.6	55.8	58.0	52.5	55.7	58.0	61.3

Note: Rates are per 100,000 population; ICD-9 Codes 490-496.
White, Black, and Asian/Other exclude Hispanic ethnicity. Hispanic includes any race category.

* Death rate unreliable, relative standard error is greater than 30%.
\+ Standard error indeterminate, death rate based on no (zero) deaths.
\- Upper and lower limits at the 95% confidence level are indeterminate.

Source: State of California, Department of Finance, Race/Ethnic Population Estimates by County with Age and Sex Detail, 1970-1996, January 1998.
State of California, Department of Health Services, Death Records.

TABLE 4
DEATHS DUE TO CHRONIC OBSTRUCTIVE PULMONARY DISEASE
CALIFORNIA COUNTIES. 1994-1996
(By Place of Residence)

COUNTY	DEATHS 1994-1996	1994-1996 DEATHS (AVERAGE)	PERCENT	1995 POPULATION	CRUDE RATE	AGE-ADJUSTED RATE	95% CONFIDENCE LIMITS LOWER	UPPER
CALIFORNIA	33,155	11,051.7	100.0	32,062,912	34.5	21.0	20.5	21.4
ALAMEDA	1,246	415.3	3.8	1,347,739	30.8	19.3	17.3	21.4
ALPINE	0	0.0	0.0	1,185	0.0 +	0.0 +	-	-
AMADOR	52	17.3	0.2	32,572	53.2	15.6	7.7	23.5
BUTTE	446	148.7	1.3	196,108	75.8	29.9	24.2	35.7
CALAVERAS	55	18.3	0.2	36,907	49.7	16.7	8.1	25.3
COLUSA	24	8.0	0.1	17,799	44.9 *	25.0 *	6.2	43.9
CONTRA COSTA	848	282.7	2.6	867,315	32.6	18.2	15.9	20.5
DEL NORTE	45	15.0	0.1	27,597	54.4	31.8	13.9	49.6
EL DORADO	165	55.0	0.5	144,158	38.2	20.5	14.7	26.3
FRESNO	760	253.3	2.3	754,045	33.6	22.1	19.1	25.0
GLENN	49	16.3	0.1	26,523	61.6	29.2	13.6	44.9
HUMBOLDT	248	82.7	0.7	124,481	66.4	35.9	27.4	44.5
IMPERIAL	91	30.3	0.3	137,445	22.1	15.0	9.2	20.8
INYO	40	13.3	0.1	18,571	71.8	20.6 *	7.4	33.8
KERN	662	220.7	2.0	616,701	35.8	24.9	21.4	28.4
KINGS	105	35.0	0.3	114,902	30.5	25.2	16.2	34.3
LAKE	172	57.3	0.5	54,984	104.3	31.7	21.9	41.5
LASSEN	40	13.3	0.1	28,678	46.5	28.1	11.8	44.3
LOS ANGELES	7,870	2,623.3	23.7	9,352,192	28.1	18.3	17.6	19.1
MADERA	134	44.7	0.4	106,429	42.0	24.5	16.6	32.3
MARIN	284	94.7	0.9	238,981	39.6	18.4	14.3	22.4
MARIPOSA	32	10.7	0.1	15,903	67.1 *	24.1 *	7.2	40.9
MENDOCINO	124	41.3	0.4	84,269	49.0	23.1	15.2	30.9
MERCED	206	68.7	0.6	198,522	34.6	24.8	18.5	31.2
MODOC	12	4.0	a	10,064	39.7 *	16.0 *	0.0	33.3
MONO	4	1.3	a	10,624	12.6 *	11.6 *	0.0	31.3
MONTEREY	295	98.3	0.9	361,840	27.2	17.5	13.7	21.2
NAPA	195	65.0	0.6	117,735	55.2	22.6	16.1	29.1
NEVADA	146	48.7	0.4	86,506	56.3	20.0	13.5	26.5
ORANGE	2,292	764.0	6.9	2,614,851	29.2	19.2	17.8	20.7
PLACER	327	109.0	1.0	203,454	53.6	27.4	21.8	33.0
PLUMAS	36	12.0	0.1	20,484	58.6	21.0 *	5.9	36.1
RIVERSIDE	1,925	641.7	5.8	1,370,338	46.8	23.7	21.6	25.8
SACRAMENTO	1,422	474.0	4.3	1,117,748	42.4	26.3	23.7	28.8
SAN BENITO	33	11.0	0.1	42,604	25.8 *	15.4 *	5.6	25.3
SAN BERNARDINO	1,872	624.0	5.6	1,581,620	39.5	30.7	28.1	33.3
SAN DIEGO	2,958	986.0	8.9	2,669,280	36.9	22.0	20.5	23.5
SAN FRANCISCO	761	253.7	2.3	751,532	33.8	15.4	13.2	17.5
SAN JOAQUIN	602	200.7	1.8	524,611	38.3	24.1	20.4	27.8
SAN LUIS OBISPO	351	117.0	1.1	228,401	51.2	22.6	17.9	27.3
SAN MATEO	702	234.0	2.1	689,731	33.9	16.8	14.5	19.2
SANTA BARBARA	432	144.0	1.3	391,425	36.8	18.5	15.1	22.0
SANTA CLARA	1,188	396.0	3.6	1,603,340	24.7	17.0	15.2	18.7
SANTA CRUZ	274	91.3	0.8	241,510	37.8	20.3	15.6	25.0
SHASTA	354	118.0	1.1	160,877	73.3	36.1	28.9	43.3
SIERRA	7	2.3	a	3,410	68.4 *	26.1 *	0.0	65.0
SISKIYOU	81	27.0	0.2	44,616	60.5	24.8	14.6	35.1
SOLANO	380	126.7	1.1	370,556	34.2	26.4	21.6	31.2
SONOMA	555	185.0	1.7	419,459	44.1	21.3	17.8	24.8
STANISLAUS	555	185.0	1.7	413,806	44.7	27.8	23.4	32.2
SUTTER	109	36.3	0.3	73,721	49.3	27.1	17.7	36.6
TEHAMA	117	39.0	0.4	54,195	72.0	30.7	19.5	41.9
TRINITY	23	7.7	0.1	13,363	57.4 *	23.6 *	6.2	40.9
TULARE	397	132.3	1.2	349,860	37.8	24.3	19.7	28.9
TUOLUMNE	94	31.3	0.3	51,516	60.8	22.8	13.8	31.7
VENTURA	664	221.3	2.0	712,762	31.1	19.5	16.7	22.3
YOLO	195	65.0	0.6	150,812	43.1	30.5	22.4	38.7
YUBA	99	33.0	0.3	62,255	53.0	34.3	21.6	47.0

Note: Rates are per 100,000 population; ICD-9 Codes 490-496.

* Death rate unreliable (relative standard error is greater than 30%).

\+ Standard error indeterminate, death rate based on no (zero) deaths.

a Represents a percentage of more than zero but less than 0.05.

\- Confidence limit is not calculated for zero events.

Source: State of California, Department of Finance, Race/Ethnic Population Estimates by County with Age and Sex Detail, 1970-1996, January 1998.
State of California, Department of Health Services, Death Records.

TABLE 5
POPULATION ESTIMATES
BY RACE/ETHNICITY, SEX, AND AGE
CALIFORNIA. 1996

RACE/ ETHNICITY	TOTAL	AGE GROUPS										
		Under 1	1 to 4	5 to 14	15 to 24	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	75 to 84	85 & Older
Total	32,383,811	540,625	2,298,325	4,914,945	4,217,867	5,357,377	5,401,744	3,806,109	2,359,866	1,954,134	1,161,701	371,118
Male	16,227,924	276,538	1,175,708	2,514,194	2,198,841	2,828,447	2,741,290	1,887,994	1,146,990	879,924	465,740	112,258
Female	16,155,887	264,087	1,122,617	2,400,751	2,019,026	2,528,930	2,660,454	1,918,115	1,212,876	1,074,210	695,961	258,860
Asian/Other	3,645,998	60,717	254,397	564,354	533,767	599,056	631,504	438,067	256,917	188,491	92,392	26,336
Male	1,791,148	31,247	131,069	288,489	274,693	301,165	303,109	207,939	120,782	81,782	39,642	11,231
Female	1,854,850	29,470	123,328	275,865	259,074	297,891	328,395	230,128	136,135	106,709	52,750	15,105
Black	2,275,401	37,276	170,539	388,094	345,698	395,287	371,892	242,802	152,306	102,194	53,430	15,883
Male	1,121,544	18,939	86,386	196,545	182,527	203,575	180,097	114,139	71,336	43,656	19,675	4,669
Female	1,153,857	18,337	84,153	191,549	163,171	191,712	191,795	128,663	80,970	58,538	33,755	11,214
Hispanic	9,330,740	252,617	1,034,656	1,816,510	1,436,639	1,808,376	1,372,005	747,447	416,154	280,103	122,130	44,103
Male	4,830,901	128,626	527,237	925,990	749,483	1,012,882	720,340	376,227	200,126	126,447	48,089	15,454
Female	4,499,839	123,991	507,419	890,520	687,156	795,494	651,665	371,220	216,028	153,656	74,041	28,649
White	17,131,672	190,015	838,733	2,145,987	1,901,763	2,554,658	3,026,343	2,377,793	1,534,489	1,383,346	893,749	284,796
Male	8,484,331	97,726	431,016	1,103,170	992,138	1,310,825	1,537,744	1,189,689	754,746	628,039	358,334	80,904
Female	8,647,341	92,289	407,717	1,042,817	909,625	1,243,833	1,488,599	1,188,104	779,743	755,307	535,415	203,892

Note: White, Black, and Asian/Other exclude Hispanic ethnicity. Hispanic includes any race category.

Source: State of California, Department of Finance, Race/Ethnic Population Estimates with Age and Sex Detail, 1970-1996, January 1998.

Notes

The chronic obstructive pulmonary disease death data presented in this report are ICD-9 codes 490-496.

The term "significant" within the text indicates either statistically significant based on the slope of a least-squares line not equal to zero ($p<.05$), or statistically significant based on the difference between two independent rates ($p<.05$).

As with any vital statistics data, caution needs to be exercised when analyzing small numbers, including the rates derived from them. Death rates calculated from a small number of deaths and/or population tend to be unreliable and subject to significant variation from one year to the next. To assist the reader, 95 percent confidence intervals are provided in the data tables as a tool for measuring the reliability of the death rates. Rates with a relative standard error (coefficient of variation) greater than 30 percent are indicated with an "*" (asterisk). Also, three-year averages were used in **Table 4** to increase the reliability of the rates derived from small numbers, and to reduce the year-to-year variability inherent among these rates.

The four race/ethnic groups presented in the tables are mutually exclusive. White, Black, and Asian/Other exclude Hispanic ethnicity, while Hispanic includes any race/ethnic group. In order to remain consistent with the population data obtained from the Department of Finance, the "White race/ethnic group" includes: White, Other (specified), Not Stated, and Unknown; and the "Asian/Other race/ethnic group" includes: Aleut, American Indian, Asian Indian, Asian (specified/unspecified), Cambodian, Chinese, Eskimo, Filipino, Guamanian, Hawaiian, Japanese, Korean, Vietnamese, Other Pacific Islander, Samoan, Thai, and Laotian. Race/ethnic data are not presented for years prior to 1985 due to the unavailability of mutually exclusive data for Hispanics and Whites. In addition, caution should be exercised in the interpretation of mortality data by race/ethnicity. Misclassification of race/ethnicity on the death certificate may contribute to death rates that may be underestimated among Hispanics and Asian/Other.[6]

The method used to analyze vital statistics data is also important. Analyzing only the number of deaths has its disadvantages and can be misleading because the population at risk is not taken into consideration. Crude death rates, on the other hand, show the actual rate of dying in a given population, but the age composition of that population is not taken into consideration. Therefore, the use of age-adjusted death rates becomes the preferred method for measuring death rates over time, and for comparing death rates between race/ethnic groups, sex, and geographic areas. The 1940 United States (standard million) population was used as the basis for age-adjusting in this report.

For a more complete explanation of the age-adjusting methodology see the *Healthy People 2000 Statistical Notes* publication.[7] Detailed information on data quality and limitations as well as the formulas used to calculate vital statistics rates are presented in the appendix of the annual report, *Vital Statistics of California*.[4] Another source of information is the Department of Health Services, Center for Health Statistics Home Page [www.dhs.ca.gov].

References

1. Morgenstern H, Bursic ES. A Method for Using Epidemiologic Data to Estimate the Potential Impact of an Intervention on the Health Status of a Target Population. *J Community Health*; Vol. 7, 1982.

2. U.S. Department of Health and Human Services. Current Estimates From the National Health Interview Survey, 1994. *Vital and Health Statistics.* Hyattsville, Maryland: Public Health Service, DHHS Pub. No. (PHS) 96-1521; Series 10, No. 193, December 1995.

3. Peters KD, Kochanek KD, Murphy SL. Deaths: Final Data for 1996. *National Vital Statistics Reports*. Hyattsville, Maryland: Public Health Service, DHHS Pub. No. (PHS) 99-1120; Vol. 47, No. 9, November 1998.

4. Riedmiller K, Harms C. *Vital Statistics of California, 1996.* Center for Health Statistics, California Department of Health Services, September 1998.

5. U.S. Department of Health and Human Services. *Healthy People 2000 Review 1997.* Hyattsville, Maryland: Public Health Service, DHHS Pub. No. (PHS) 98-1256, October 1997.

6. Hahn RA, Mulinare J, Teutsch SM. Inconsistencies in Coding Race and Ethnicity Between Birth and Death in US Infants. *The Journal of the American Medical Association*, Vol. 267, No. 2, January 1992.

7. Curtin LR, Klein RJ. Direct Standardization (Age-Adjusted Death Rates). *Healthy People 2000 Statistical Notes*. National Center for Health Statistics, DHHS Pub. No. (PHS) 95-1237, March 1995; No. 6-Revised.